



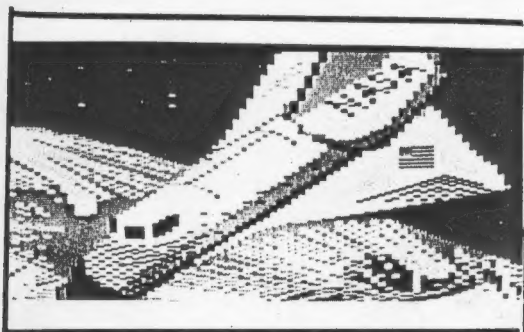
RAMPAGE^{INC.}

COMPUTER PRODUCTS

CYBER

GRAPHICS UTILITY

by BOB SHIMER FOR ATARI 400/800



***No license is required to use CYBER GRAPHICS in programs you may wish to sell, however, we do request that you give CYBER GRAPHICS credit in your



INTRODUCTION

Cyber Graphics is designed to be an all in one graphics utility. It is a sophisticated utility and whether you are familiar with Atari graphics or not you should carefully go through these instructions and practice with the DRAWING UTILITY, the P/M EDITOR and the CHARACTER SET UTILITY BEFORE you decide to do any serious programming.

GETTING STARTED

- 1) Turn on the disk drive
- 2) When the busy light goes out insert the CYBER GRAPHICS disk
- 3) Insert the BASIC cartridge into your computer.
- 4) Turn on the computer and CYBER GRAPHICS will automatically load.
- 5) When the Introduction screen appears press the START key.
- 6) A menu will appear. Select the utility you wish to work with by simply pressing the number that corresponds to the number next to the utility - it will autoloading.

CYBER DRAWING UTILITY

The DRAWING UTILITY is used with the joystick in any graphic mode 3 thru 11, including Antic Modes C and F. It can be used with modes 0,1, and 2. However, these are text and character modes and it is questionable if these modes would be very useful.

After the program has loaded you will be asked several questions. The first is "Alternate character set?". If you are just getting started Type N. If you have already created a data disk of alternate characters that you wish to use with the Drawing Utility type Y. Up to 9 complete sets of 128 characters can be handled by this utility. To load the sets you must use the full file name of the set. There are 2 character sets included on this disk. Their names are D:ANTICAS.CHR which has all capitals for use in antic modes 4&5. Also included are D:GRAPHIC.CHR which has large and small capital letters for use in graphics drawing. You should experiment with these sets. In order to conserve memory the sets are loaded from disk as



they are needed and only one is in RAM at any given time, therefore the disk on which your sets are stored must be in the disk drive as you use the Drawing Utility. There is more on the use of character sets in that part of this book.

The next question you will be asked "Load from disk?" Again, if you are just learning, type N. However, if you have already completed a graphics screen and would like to edit some parts of it, or you were unable to complete a graphics screen you started and you saved to disk, you may load that screen at this time Type Y. You will be asked for the full file name to be loaded. Enter the name (ie: D:\WATERFALL). You will then be given the opportunity to change the colors of the picture you are about to load. If you want to edit the colors type Y. If you do not wish to change colors type N. In either case the picture will load from disk and you may proceed to complete or edit your picture.

If you answered NO to the previous questions you will be asked "GRAPHICS MODE?" Enter the graphics mode you desire. You may wish to check the Mode Chart enclosed for details on each mode. All modes will be displayed without the text window. After entering the mode number you will then be prompted to enter the colors and luminosities. Again check the mode chart to determine how many colors are in each mode. When the color and luminosity have been entered the color will appear on the screen and you will have the opportunity to accept or reject that color. To enter the color in its register press START to reject the color press SELECT.

After the last color has been entered the screen will be set to start drawing. The cursor, which is the size of one pixel, will be blinking in the upper left hand corner of the screen. If your TV is not properly adjusted you may have to move the joystick to the right until the cursor appears. To begin drawing plug a joystick into port 1. Now read these drawing commands.

It may be helpful to write down the colors of each register before you draw or for future reference.

DRAWING COMMANDS

0-9 or A-F: By pressing one of these keys you will change the drawing color or and also reset the cursor together. Check the color chart. Only in Mode 11 will it be necessary to use A-F.

CTL N: Press CONTROL and type N together then type the number or letter of the color you want. This method will change the drawing color but will not reset the cursor.

CTL C: This command will change your drawing mode from the fill mode to continuous draw and from continuous draw back to the fill mode.

X : Type X and the plotting points are exchanged. If you wish to move the cursor which remains stationary, type X and the stationary cursor will move and the moving cursor will be stationary.

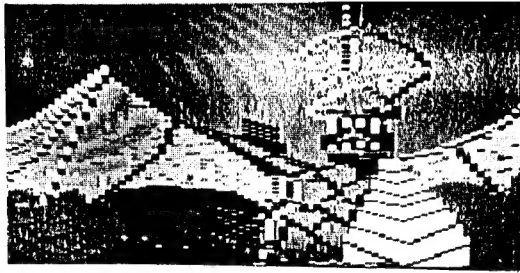
CTL T: By typing Control T you will save your graphics to disk under the name of "D:TEMP.GRA".

CTL Q: This command restarts the program and any graphics on the screen will be lost. After pressing CTL Q press START to initiate the restart command.

*** PLEASE NOTE that before you begin to draw change the last color, if you don't you will be drawing in the background color and nothing will appear.***

When drawing the cursor will be the same size as the smallest pixel for the graphic mode you happen to be in. For example the pixel will be much larger in mode 3 than in mode 10 because mode 3 uses larger pixels to produce an image than mode 10. This is done to permit fine detailing in your drawing.

There are 2 cursors, a stationary one which is the reference cursor and a moving cursor. These 2 cursors are together at the upper left hand corner of the screen at the start of the program. The moving cursor can be moved in any direction with the joystick. If the red button on the joystick is not depressed the moving cursor will move and not draw. The longer you move the cursor the faster it will move. However, if you wish rapid movement of the cursor press the START key while moving the cursor and it will jump across the screen. (Try it.)



There are 2 drawing modes you may use and you change from one to the other with the the CTL C command. When you start you are in the normal or fill mode. This will draw a line from the stationary cursor to the moving cursor when the red button on the joystick is pressed. In the mode you may also fill in large areas of the screen with color by simply holding down the red button while moving the trailing cursor. You may find it necessary to exchange plotting points with the X command to achieve the desired effect. Practice with this technique. It will be of great help to you.

If you use the CTL C command you will change to the continuous draw mode. In this mode you will leave a trail behind the moving cursor and will not fill or draw between the 2 points. This mode is good to achieve fine line detail.

OTHER COMMANDS

Read all steps first.

STEP (1): OPTION: When OPTION is pressed you will hear 2 tones. This means that the CHARACTER MODE is on. If an ALTERNATE CHARACTER SET is used 0 will allow you to use the current set in memory. (Standard key board gives you CAPITALS only. If you type 1-9 you will load another set into memory based on the number you type, but you must have an alternate character set file loaded. Any ALPHABET KEY that is typed will allow you to use the standard set.

STEP (2): When you have entered the set you will hear 4 tones. This is to prompt you to enter a 4 digit character mode number. The 1st digit is equal to the number of Horizontal Pixels per bit. The 2nd digit is equal to the Horizontal skip value. Any number above 1 will produce Vertical stripping of your character. The 3rd digit is equal to the Vertical lines per bit. The 4th digit is equal to Vertical skips and any number above one will produce Horizontal Strips.

STEP(3): You will then hear a high tone which prompts you for the color of the characters.

STEP(4): After you have selected your color position the cursor to the upper left hand corner of where you want to print the character and press the KEY that indicates that character. You will hear a series of tones as the character is drawn.

Example: Type 1,1,1,1 and then enter the color as in Step 3 after the high tone color prompt. Enter 1 thru 16 depending on the drawing mode then go to Step 4.

POSITION CURSOR TO

UPPER LEFT OF WHERE

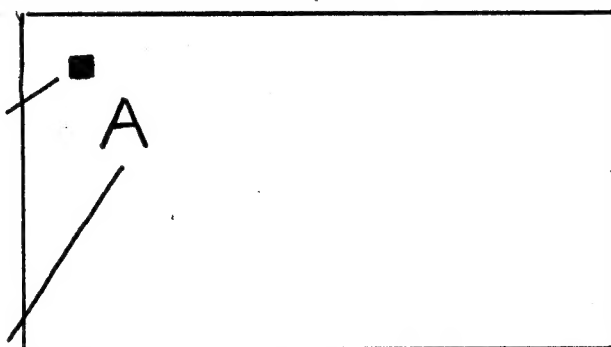
YOU WANT THE CHARACTER

PRESS KEY AND THE

CHARACTER WILL BE

DRAWN AT THAT POSITION

CURSOR CHARACTER



Pressing the OPTION key will suppress the printing of the character. If you press the START key and hold it down the character will finish. Holding the START key after the character is drawn will advance the cursor one character width. Pressing the SELECT key after the completion of the character will advance the cursor in the vertical direction. You may use these keys separately or in combination.

If you press the OPTION key while you are in a character mode you will be prompted for a new color, all other parameters will stay the same. If you press the RETURN key instead of a color number you will be able to input all the parameters just as when you first entered the character mode.

CONTROL S If you type control S you will hear a series of high tones and your picture will be saved to disk under the name you had previously given it. If you hear a harsh tone there is an error in saving--perhaps you left a write protect on the disk to receive the data or your disk may be full.

CONTROL T If your program does not load under Control S, or you forgot to give your picture a name, press Control T and your program will be saved under TEMP.GRA. Make sure your file disk does not already have a program with this name.

Completed CYBER DRAWING pictures can be transferred to your Basic programs by referring to the USER MODULE section.

CYBER PUZZLE

If you have one of the CYBER PUZZLE programs you can use CYBER GRAPHICS to create your own pictures and use them in the puzzle programs to make your own puzzle. There are two types of CYBER PUZZLES. The standard puzzle with non-animated pictures and CYBER II which uses animated pictures, which continue to move even after the picture has been broken up. To use CYBER GRAPHICS with the standard puzzles create your picture in modes 8,9,10, or 11 and name your picture with the file extender .GRA. The puzzle program should then be booted normally. Next insert your disk with your picture on it just before the menu of puzzles appears. Then proceed with the puzzle program as you normally would do.

With CYBER II animated puzzles a utility appears on the puzzle disk to create animated puzzles. You will need CYBER GRAPHICS working in conjunction with this utility to create animated puzzles, or pictures. Follow the instructions included with CYBER PUZZLE II.

MICRO CONVERSION

CYBER GRAPHICS can be used with graphics created with Micropainter(TM DataSoft). The conversion routine included in the user module will allow you to convert from the Micropainter format to the CYBER GRAPHIC format without any loss of detail or change of color and also allows you to use these graphics in your own programs. You can also edit and letter on these graphics with the DRAWING UTILITY. This conversion is two way in that not only will it convert Micropainter to CYBER GRAPHICS but also CYBER GRAPHICS, in mode E, to Micropainter. Consult the USER MODULE for details on the transfer.

CHARACTER DRAWING

To load the CHARACTER DRAWING utility type the number 2 when the menu appears. A title page will appear on the screen for a few seconds. Next you will be asked if you want to use the utilities. If you are a first time user it would be best to type N. If you type Y refer to the USER MODULE section of this book. The next prompt will be "What Character Mode do you want?": if you type 1 you will be in the ANTIC MODE, if you type 2 you will be in the BASIC MODE. Again if you are a beginner type 1 since the ANTIC MODE is the easier of the two to use.

ANTIC MODE

The ANTIC MODE is a special character set where each element in the character is 2 bits instead of 1 as in the normal character set. In the ANTIC MODE you will be able to use up to 40 characters per line with four colors plus the background. The colors that will appear on the screen are as follows: If you type 0 Black will be the color in use, 1=RED, 2=GREEN, 3=BLUE. In the ANTIC MODE you may create multi-color characters, simply change the color command number from 0 thru 3 while creating the character.

Characters created in the ANTIC MODE will only be 4 pixels wide instead of the normal 8, however, they will still be 8 bytes high. If you want wider or higher characters simply combine 2 or more to create exactly what you need.

A grid will appear on your screen which is used to draw your character set. The cursor will be in the upper left hand corner of the grid. In the ANTIC MODE the grid is 16 characters wide by four characters high. Move the cursor from left to right and watch the "Bar" at the top of the grid when your cursor enters a portion of the grid that starts another character, the bar will jump to that section. This is important if you are not aware of your position in the grid you may be drawing 1/2 of your character in one portion and 1/2 in another and therefore require two keys to reproduce your character, when it may have very well fit into one. (If you are already in ANTIC MODE goto the commands section.)

THE BASIC MODE

As in the Antic Mode a grid will appear on your screen. However, you will notice that this grid is only 8 characters wide by 4 characters high and that each character is 8 pixels wide instead of 4 as in the Antic Mode. Another major difference in the BASIC MODE is that each character may only be one color. The character is created in the same way as in the Antic Mode.

CREATING CHARACTERS

In either the Basic or the Antic Modes you can create your characters by using the joystick to move the cursor. Press the "FIRE" button when you want to draw and release when you just wish to change the position of the cursor. Next read the COMMAND INSTRUCTION CAREFULLY.

COMMANDS

Under the grid in the text window you will see the following information:

- 1) COLOR#
- 2) CHAR.(0,0)- C-R Column,Row
- 3) BIT
- 4) BYTE

1) In the ANTIC MODE you may change the color you are drawing by simply typing 0,1,2,or 3 and the color you select will appear next to COLOR in the text window.

In the BASIC MODE you simply type 1 to draw or 0 to erase, either 1 or 0 will appear in the text area.



2) CHAR, C-R indicates what column or row you are in.

3) BIT indicates what BIT or BIT pair you are working on.

4) BYTE tells you what byte you are working on.

NOTE: In both BASIC or ANTIC MODES use # 0 to erase.

START: Pressing the START key will bring a menu of other commands to the text area. You may return to the character mode by pressing RETURN.

1) The Save Character command will save your character to memory. It is stored in the address of the standard character set key which is pressed in response to the prompt. To save a character place the cursor in the portion of the grid that contains the character you want to save, then press START, type 1 and then type the key of the standard set you want to save your character to. (For example if I have created a division sign and wish to save it to the letter "A" I type "A" when prompted and my character will be saved at the address of "A"). After you have saved a character the screen will return to the grid. Repeat this procedure until you have saved all the characters to standard set addresses, that you wish to.

2) The Load Character command will load the set which was stored in memory under the prompted key onto the screen in that portion of the Grid where the cursor is positioned.

3) The Save Set command allows you to save your entire character set to disk. You will be prompted for a file name. The name should be D:(N), in other words your file name should be preceded by D: . Make sure you have a formatted disk in your drive. The set will automatically be saved after the name is entered. The saved Character Set file may now be used with the Cyber Drawing Utility or in your own Basic program using the User Module.

4) The Load Character set command will prompt for a file name and then it will load that alternate set from disk to memory. It will not load it to the screen. Make sure that you have placed the disk which contains the set you want to load into the drive. If you type S, the standard character set will be down loaded into the memory area of the alternate character set. If Q is typed or RETURN is pressed you will return to the drawing mode.

5) When you type S you will bring up a self prompting mini-DOS. Type the desired command number and press RETURN. Follow any further instructions. When you return from the mini-DOS all will be as you left it.

6) Test Mode ANTIC: If you are in the ANTIC mode and wish to test a character that you have already saved to a standard character address type 6 read the brief instructions that appear and press START. Now if you type one of the standard set keys to which you have saved one of your special characters will appear on the screen. Refer to the example of the division sign being saved under the letter a. If I type A in the test the division sign will appear. To return to the drawing mode type CLEAR and then CONT and press RETURN. Since some of your characters may be saved under the letters C, O, N, or T don't worry about what appears on the screen.

7) Test in the BASIC MODE: If you are in the Basic Mode it is a bit more complex to test your character. Press 6 and the instructions will appear. Press START and you will see 'STOPPED AT LINE 850' in the text window. THIS IS SUPPOSED TO HAPPEN. Now press the standard keys under which you have saved your characters and they will appear in the text window, not in the upper portion of the screen as in the Antic Mode. To return to the grid press RETURN -when you do an error message will appear, disregard the message and just type CONT, press return and all will be well.

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PLAYER MISSILE DRAWING

The P/M Drawing is similar to the Character Drawing program in that it uses a Grid to allow drawing of all the players and missiles at one time. To load the P/M Utility type 3 when the Main Menu appears. You will then see a title page and then instructions. Press START and you will be given the option of single or double resolution. Once you have made your selection, a drawing grid will appear on the screen.

option of single or double resolution. Once you have made your selection, drawing grid will appear on the screen.

PLAYER 1 2 3 4

MISSILE

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At the bottom of the screen you will find the player number which will indicate that portion of the grid in which you have the cursor. You will also see the line number and the color. Since the entire player may be in only one color your choices for color are 0 for blank and 1 for color. When drawing press 1 and then the "FIRE" button as you move your cursor. As in the Character Utility there is a bar at the top of the grid which will indicate which player or missile you are currently drawing.

After you have created your players and missiles press START and a command menu will appear in the text window. Command 1 will store the player or missile that you last left the cursor on in the grid. The number of the player or missile being stored will appear in the text window. If you wish to store all players and missiles type 3 and all the P/M Characters will be stored. In the like manner as commands 1 & 3, commands 2 & 4 will load either one player or missile if 2 is typed or all the players and missiles if 4 is typed.

Command 5 is used to 1) save to disk 2) load from disk or 3) display data. To save to disk 1st type 5 then follow the prompts. To review the data statements that comprise your players and missiles type 5 then type 3.

Command 6 will allow you to test your players and missiles. After pressing START, type 6 and your creation will appear on the screen. Move the joystick left or right and Player 1 will move left and right. To move Player 2, type 2 first and move the joystick. All four players will move in response to their typed number. The missiles will respond to number 5,6,7 and 8.

Command 7 will take you to the Mini DOS.

The Data file created can be used in your own basic programs.

MICROTRANSFER

If you have Micropainter(TM Datasoft), a graphics program you will be able to use the graphics created with Micropainter in Cyber Graphics or in your own programs using the User Module. Micropainter uses a special graphics mode called Antic E. The Cyber Mode 107 will support Antic E. There will probably be a difference in the format of the disk. Cyber Graphics are stored in the following format: BYTE 1 Graphic Mode

BYTE 2-10 Color register 704 thru 712 regardless of graphic mode. Remaining bytes are the display data. This format was choosen because it is the most flexible in supporting all graphic modes. Most other programs support only one mode and thus do not need this added flexibility.

Microtransfer is a conversion routine which will convert between Cyber Graphics and Micropainter, as well as other popular graphics drawing programs.

RUNNING MICROTRANSFER

To run Microtransfer boot the Cyber Graphics disk normally and choose Option 4. Item 6 on the menu is the Microtransfer routine. In fact there are three different routines available in Microtransfer and all 3 work in both directions. That is from the other program to Cyber Graphics and from Cyber Graphics to other utilities. Each routine will ask for an input and output file name; will load the graphic and wait until START is pressed before writing out to disk. Press OPTION to abort and return to the conversion menu.

THE THREE ROUTINES ARE:

1) Normal uses ANTIC MODE E for both formats.(number 1,2)

2) Modified uses ANTIC MODE E for the other format and allows you to define the basic mode you want for Cyber Graphics. It will read in Antic E and then rewrite to the screen in the desired Basic Mode.(number 3,4)

3) Skip uses ANTIC MODE E for the other format and Cyber Graphics as Basic Mode 7, skipping every other Antic Mode E line. Because of the skipping lines this routine is slow. (number 5,6)

7) Will return you to the utility mode.

Each of the 3 routines has its advantages and disadvantages. The Normal routine(1) is the most accurate between formats but more difficult to use from Basic. Screen plotting commands will only work in the top half of the screen. The modified routine can be easily used from Basic, however, the colors will be different and some details may be lost. Basic Mode 8(2) will exhibit artifact colors. The Skip routine(3) can be easily used from Basic and will have true colors, however some details may be lost due to the line skipping technique.

Remember that in the Antic Mode and in the Normal Routine you can only draw in the top half, to swap to the lower half of the screen simply press CTRL B.

NOTE: Follow prompts, if load does not function it means a mistake in entering data has occurred. Just reload the MICROTRANSFER UTILITY and run it again.

EXAMPLE:

Which?

In file D:(file name)

Out file D: name .GRA

always use the .GRA extender in CYBER GRAPHICS.

CYBER TIPS

A very valuable tool in creating graphics is the handling of character sets. In the character mode, you control the size, height, and width in solid, striped, or checked. Since you can use alternate character sets, you can design your own various shapes you want to use in your graphics. You then can build a library of shapes to use for future use in your programs.

Large areas of color can be drawn by using an inverse space (or other graphics symbol). The four digit character mode controls the size. Artifact colors can be generated by skipping every other vertical column. A code of 2221 will generate colored characters in Mode 8. The exact color depends on the starting point (cursor location). Move 1 pixel to the side to change colors. You can also draw in artifact color by printing an inverse space in color 0 using vertical stripes. This method will overlay the original drawing, erasing (setting to background color) every other column. Again, the color will be determined by the position of the cursor.

Occasionally you may have trouble positioning the cursor to the edge or corner of the screen. It is best to avoid using the edge and corners but if you need to and have trouble, try moving the cursor away and then back to the edge. You may have to try several times but it can be done.

If you press a color and then move to a new location and press the color again, you may leave a dot at the first location. You can go back and erase the dot but it is best to press a color only when you are where you want to draw.

A couple of cautions. When moving the cursor around, make sure both cursors are where you want them to be BEFORE pressing the trigger. I have tried several times and accidentally drawn a line through something because I did not watch this. Remember that when you are in the Character Mode, pressing any key will cause that key's character or symbol will be printed on the screen. The control characters do not work, THEY PRINT. You must be in the graphic mode before using the control codes; eg. CTRL S to save to disk, etc. If you accidentally start printing a character (tones will start), press OPTION to suppress printing. Hold until tones stop.

If you are using Votrax, this program will be especially easy. All the

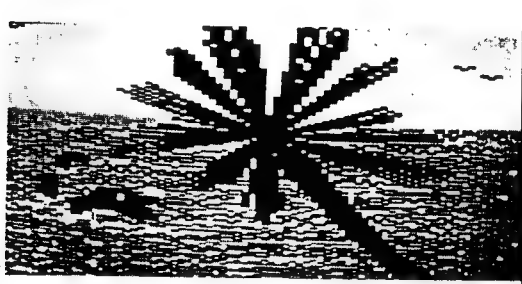


prompts during the Drawing program will be by voice. The Votrax should be connected to R2; and set to 9600 Baud. The tone prompts will still be used in addition to the voice. The voice will also confirm many commands in the graphic mode.

The best way to use this Utility is to practice until you get proficient. Experiment and have fun. Some of the techniques such as shading and speeding up the cursor before drawing need practice to be effective. It is a tool that can be used to create and use more of the exciting graphic potential of your Atari computer.

ANTIC DRAWING

For all practical purposes Drawing in the Antic Modes is the same as in other Atari modes, except that when you are prompted for the Graphic Mode enter 106 if you want Antic Mode C or 107 if you want to draw in Antic Mode E. In Mode C(106) you draw in only 2 colors (0 and 1) and in Mode E you may select 4 colors (0,1,2,3). Other than entering a three digit code to indicate your Antic Mode there will be two other differences from the other modes. The first one will occur when the drawing screen loads. The screen will first go black and then the background color will appear. Another and more noticable difference that will find in the Antic modes is that you will be able to draw on only one half of the screen at one time. In order to complete your screen press CTRL B and the screen will flip flop so that you may continue on the other half of the screen.



USER MODULE

This USER MODULE should be appended to your program by typing ENTER "D:USER.MOD". This module uses lines 29000 thru 29058. These line numbers should not be used otherwise in your program. The module is accessed by setting the variable AUX3 to the desired function and calling the module by GOSUB 29000. For some functions you will have to OPEN a file and set the variable AUX1. A listing of the module is provided for those who desire to make their own modifications.

SEE USER MODULE PROGRAM PRINTOUT ENCLOSED

The following is a list of the values for AUX3 and what they do:

*** AUX3=1 ***

Loads screen graphics from disk. AUX1=4:OPEN#2,AUX1,0,"D:file name"

*** AUX3=2 ***

Loads screen graphics from disk, wiping over the existing screen graphic. Both the current screen graphic and the one to be loaded must use the same graphic mode and colors for this work properly. AUX1=4:OPEN #2,AUX1,0,"D:file name"

*** AUX3=3 ***

Saves screen graphic to disk. AUX1=8:OPEN#2,AUX1,0,"D:file name":PUT #2, graphic mode . For ANTIC MODE C use 106 for the Graphic Mode; for ANTIC MODE E use 107.

*** AUX3=4 ***

Sets variable MEM as pointer to alternate character set. This variable must be set either by this routine or another before you use the USER MODULE to load a character set as it uses MEM. MEM is the high byte only and the complete address is MEM*256. The character set can be pointed to POKE 756,MEM. For Basic modes 1 & 2 use POKE 756,MEM and POKE 756,MEM+2.

*** AUX3=5 ***

Loads character set to location pointed to by variable MEM. AUX1=4;OPEN #2,AUX1,0,"D:file name" can be used to save a character set by setting AUX1=8 instead of 4. This saves the full 1K character set. Modify the variable BYTES in line 29020 for other size sets.

*** AUX3=6 ***

Changes Basic Mode 0 to Antic Mode 4 and points to the character set by the variable MEM. The mode gives you 40 characters by 24 lines in 5 colors (including background). The character set ANTIC45:CHR on the CYBER GRAPHICS disk can be used. Only upper case letters are in this set. Normal and inverse upper case letters are two colors, lower case letters will be the third color, and CTRL letter will give the fourth color.

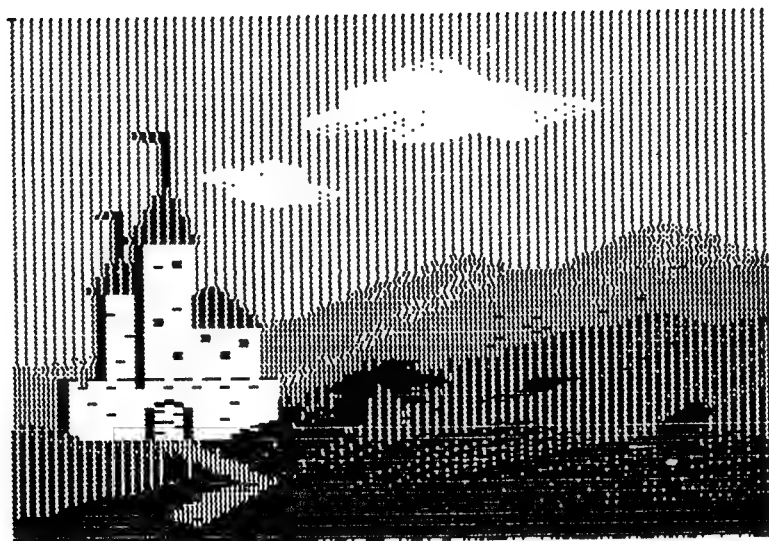
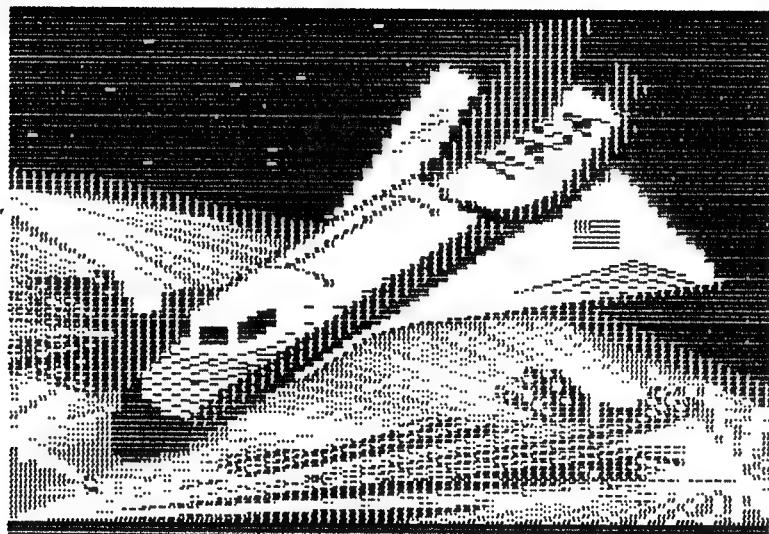
*** AUX3=7 ***

Changes Basic Mode 0 to Antic Mode 5 in the same manner as AUX3=6 for Antic 4. The difference is that this is a 40 character by 12 lines.

*** AUX3=8 ***

This is the general purpose CIO call used for these routines. To use you must set the variable STADR to the full starting address and BYTES to the number of bytes to load or save. AUX1 must be set to the desired auxilliary 1 value (4 for load, 8 for save, etc.). OPEN #2,AUX1,0,"D:file name".

NOTE: All commands have shown D: for disk drive 1. If you are using a multi drive system, use D1:,D2:,etc. as applicable.



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29001 0N AUX3 G0T0 29008,29012,29014,29050,29020,29056,29058,29022
29002 DL=PEEK(560)+PEEK(561)*256
29004 P0KE DL+3,PEEK(DL+3)-1:F0R I=DL+6 T0 DL+198
29005 IF PEEK(I)=13 0R PEEK(I)=15 0R PEEK(I)=77 0R PEEK(I)=79 THEN P0KE I,PEEK(I)-1
29006 NEXT I:P0KE 87,6-17:G0T0 29014
29008 GET #2,G:IF G>100 THEN G=G-83:GRAPHICS G:G0T0 29002
29010 GRAPHICS G:G0T0 29014
29012 GET #2,G
29014 IF AUX1=8 THEN F0R K=704 T0 712:A=PEEK(K):PUT #2,A:NEXT K
29016 IF AUX1=4 THEN F0R K=704 T0 712:GET #2,A:P0KE K,A:NEXT K
29018 STADR=PEEK(88)+PEEK(89)*256:BYTES=PEEK(106)*256-STADR+1:G0T0 29022
29020 STADR=MEM*256:BYTES=1024
29022 CMD=7:IF AUX1=8 THEN CMD=11
29024 G0SUB 29026:G0T0 29048
29026 I0CBX=2*16:IC00M=834+I0CBX:ICSTA=835+I0CBX
29028 ICRAL=836+I0CBX:ICBAH=837+I0CBX
29030 ICBL=840+I0CBX:ICBLH=841+I0CBX
29032 TRAP 29048
29034 TEMP=STADR:G0SUB 29046
29036 P0KE ICRAL,L0W:P0KE ICRBH,HIGH
29038 TEMP=BYTES:G0SUB 29046
29040 P0KE ICBL,L0W:P0KE ICBLH,HIGH
29042 P0KE ICC0M,CMD:ER0R=USR(ADR("h" LVD"))
29044 ER0R=PEEK(ICSTA):RETURN
29046 HIGH=INT(TEMP/256):L0W=INT(TEMP-HIGH*256):RETURN
29048 CL0SE #2:TRAP 40000:RETURN
29050 MEM=PEEK(742)-4:GRAPHICS 0
29052 IF MEM/4-INT(MEM/4)<>0 THEN MEM=MEM-1:G0T0 29052
29054 RETURN
29056 DL=PEEK(560)+PEEK(561)*256:P0KE DL+J,68:F0R I=6 T0 28:P0KE DL+I,4:NEXT I:P0KE 756,MEM:RETURN
29058 DL=PEEK(560)+PEEK(561)*256:P0KE DL+J,69:F0R I=6 T0 17:P0KE DL+I,5:NEXT I:P0KE 756,MEM:RETURN

```


MODE #	3	4	5	6	106	7	107	8	9	10	11
NUMBER of COLORS	4	2	4	2	2	4	4	1	1	9	16
HORIZONTAL RESOLUTION	40	80	80	160	160	160	160	320	80	80	80
VERTICAL RESOLUTION	24	48	48	96	192	96	192	192	192	192	192
MEMORY	240	480	960	1920	3840	3840	7680	7680	7680	7680	7680
REGISTER											
704										0	
705										1	
706										2	
707										3	
708	1	1	1	1	1	1	1			4	
709	2		2			2	2			5	
710	3		3			3	3			6	
711										7	
712	0	0	0	0	0	0	0			8	

